

CLAIMS

1. (Cancelled without prejudice)

2. (Currently Amended) ~~The apparatus of Claim 1,~~ Apparatus for joining a plurality of pieces of pipe, including:

a first piece of pipe and a second piece of pipe each having a similar size and shape sidewall corrugation pattern along their lengths;

a first female engagement structure formed from the sidewall corrugation pattern of the first piece of pipe; and

a male engagement structure formed from the sidewall corrugation pattern of the second piece of pipe,

the first female structure being temporarily deformed for receiving the male structure, the temporary deformation being both sufficiently large to permit the insertion of the male structure but also sufficiently small to ensure that material memory returns the first female structure toward its original non-deformed configuration with sufficient compressive force to grip the male structure and prevent its inadvertent removal from engagement with the first female structure, and

wherein the female structure includes an inwardly projecting engagement element at its leading edge acting between said first and said second pieces of pipe to increase the force necessary to disengage said pipe pieces from each other following assembly.

3. (Currently Amended) ~~The apparatus of Claim 1 or~~ Claim 2, in which said pipe sidewall corrugation pattern of each piece of pipe includes a corrugated exterior surface and an internal non-corrugated liner element.

4. (Previously cancelled without prejudice)

5. (Currently Amended) The apparatus of Claim ~~1~~2, in which said first piece of pipe includes a second female engagement structure remote from said first female structure, said second female structure also being temporarily deformed to function as a female structure for receiving a corresponding non-deformed end of a third piece of pipe, said third piece of pipe having a sidewall corrugation pattern along its length that is similar in size and shape to the sidewall corrugation pattern of said first and second pieces of pipe.

6. (Currently Amended) The apparatus of Claim ~~1~~2, including a sealing element positioned between confronting surfaces of said first and second pieces of pipe to help provide a watertight seal therebetween.

7. (Currently Amended) The apparatus of Claim ~~1~~2, including an adhesive material acting between confronting surfaces of said first and second pieces of pipe to bond said first and second pieces to each other upon insertion of said second piece into said female structure of said first piece of pipe.

8. (Currently Amended) A stretching tool for use in connection with ~~the apparatus of Claim 1,~~
an apparatus for joining a plurality of pieces of pipe, the apparatus including:

a first piece of pipe and a second piece of pipe each having a similar size and shape
sidewall corrugation pattern along their lengths;

a first female engagement structure formed from the sidewall corrugation pattern of the
first piece of pipe; and

a male engagement structure formed from the sidewall corrugation pattern of the second
piece of pipe,

the first female structure being temporarily deformed for receiving the male structure, the temporary deformation being both sufficiently large to permit the insertion of the male structure but also sufficiently small to ensure that material memory returns the first female structure toward its original non-deformed configuration with sufficient compressive force to grip the male structure and prevent its inadvertent removal from engagement with the first female structure,

the stretching tool including a channel into which an edge of said first piece of pipe can be inserted in its originally fabricated shape, said tool including means to temporarily deform said edge of said first piece of pipe.

9. (Previously Amended) The tool of Claim 8, including a plurality of rollers positionable along the inside and outside surfaces of said edge of said first piece of pipe, and further including means for exerting force to act between said rollers and said edge to deform said edge from its originally fabricated shape to eventually form a first female end.

10. (Currently Amended) A temporary stretch-holding device for use in connection with ~~the apparatus of Claim 1,~~ an apparatus for joining a plurality of pieces of pipe, the apparatus including:

a first piece of pipe and a second piece of pipe each having a similar size and shape sidewall corrugation pattern along their lengths;

a first female engagement structure formed from the sidewall corrugation pattern of the first piece of pipe; and

a male engagement structure formed from the sidewall corrugation pattern of the second piece of pipe,

the first female structure being temporarily deformed for receiving the male structure, the temporary deformation being both sufficiently large to permit the insertion of the male structure but also sufficiently small to ensure that material memory returns the first female structure toward its original non-deformed configuration with sufficient compressive force to grip the male structure and prevent its inadvertent removal from engagement with the first female structure,

~~said~~ the temporary stretch-holding device including a first portion for temporary insertion into said temporarily deformed female structure of said first pipe piece, said first portion being sized and configured to retain a sufficient degree of deformation of said temporarily deformed female structure so that, upon removal of said temporary stretch-holding device from said temporarily deformed female structure, a non-deformed end of said second piece of pipe may be inserted into engagement with said female structure.

11. (Previously Amended) The device of Claim 10, in which said device is fabricated with a sidewall corrugation pattern that is similar in size and shape to the sidewall corrugation pattern of said first piece of pipe, and further including a second portion to assist in desired removal of said device from said temporary insertion into said deformed female structure, said first portion includes a circumferential gap to allow a degree of compression of said corrugation pattern to facilitate the desired insertion into and removal from said female structure.

12. (Previously Amended) The device of Claim 10, in which said device is fabricated with a sidewall corrugation pattern that is similar in size and shape to the sidewall corrugation pattern of said first piece of pipe, and further including a second portion to assist in desired removal of said device from said temporary insertion into said deformed female structure, said second portion

includes an axially lengthwise cut to allow a degree of compression of said device to facilitate the desired insertion into and removal from said female structure.

13. (Previously Amended) The device of Claim 10, further including a second portion having a strap element upon which force can be exerted to effect the desired removal of said temporary stretch-holding device from said deformed female structure.

14. (Previously Amended) The device of Claim 10, further including a second-portion having a grippable area upon which force can be exerted to effect the desired removal of said temporary stretch-holding device from said deformed female structure.

15. (Previously Amended) The device of Claim 10, wherein said device is sized and configured for use as a cover over a pipe joint formed with said female structure after said device is removed from said temporary engagement within said female structure.

16-18 (Previously Withdrawn)

19. (Currently Amended) A coupling system for coupling pipe segments to each other, the system including:

a plurality of pipe segments each ~~pipe segment~~ having a similar size and shape sidewall corrugation pattern along its length, the corrugation pattern including:

a female end formed from the corrugation of the first pipe segment; and

a male end formed from the corrugation of a second pipe segment,

wherein at least one of said female and said male ends being temporarily deformed within its elastic limits to permit insertion of said male end into said female end, at least one of said temporarily deformed said female and said male end returning toward its original configuration following insertion of said male end into said female end, said female and male ends configured

so that hoop stresses are generated by material memory of said deformed end to maintain desired engagement between said pipe segments, and

wherein the female end includes an inwardly projecting engagement element at its leading edge acting between said first and said second segments of pipe to increase the force necessary to disengage said pipe segments from each other following assembly.

20. (Currently Amended) A pipe joint comprising:

first and second pieces of pipe having a generally uniform corrugated sidewall pattern along their lengths;

a female end of said first piece of pipe formed from said corrugated sidewall pattern by temporary expansion of said female end via application of energy thereto, said expansion not exceeding the limits of the pipe material's ability to return substantially to its original shape and size; and

a non-expanded end of said second piece of pipe insertable within said female end of said first piece of pipe while said female end is expanded,

wherein the female end includes an inwardly projecting engagement element at its leading edge acting between said first and said second pieces of pipe to increase the force necessary to disengage said pipe pieces from each other following assembly.

21-26 (Cancelled without prejudice)

27. (New) The apparatus of Claim 19, in which said first pipe segment includes a second female end remote from said first female end, said second female end also being temporarily deformed to function as a female structure for receiving a corresponding non-deformed end of a third pipe segment, said third pipe segment having a sidewall corrugation pattern along its length

that is similar in size and shape to the sidewall corrugation pattern of said first and second pipe segments.

28. (New) The apparatus of Claim 19, including a sealing element positioned between confronting surfaces of said first and second pipe segments to help provide a watertight seal therebetween.

29. (New) The apparatus of Claim 19, including an adhesive material acting between confronting surfaces of said first and second pipe segments to bond said first and second segments to each other upon insertion of said second segment into said female structure of said first pipe segment.

30. (New) The apparatus of Claim 20, in which said first piece of pipe includes a second female end remote from said first female end, said second female end also being temporarily deformed to function as a female structure for receiving a corresponding non-deformed end of a third piece of pipe, said third piece of pipe having a sidewall corrugation pattern along its length that is similar in size and shape to the sidewall corrugation pattern of said first and second pieces of pipe.

31. (New) The apparatus of Claim 20, including a sealing element positioned between confronting surfaces of said first and second pieces of pipe to help provide a watertight seal therebetween.

32. (New) The apparatus of Claim 20, including an adhesive material acting between confronting surfaces of said first and second pieces of pipe to bond said first and second pieces to each other upon insertion of said second piece into said female structure of said first piece of pipe.

33. (New) A method of coupling pipe, including the steps of:

providing the apparatus of Claim 2;

temporarily deforming the female structure to receive the male structure; and

inserting the male structure into the female structure.

34. (New) A method of coupling pipe segments, including the steps of:

providing the apparatus of Claim 19;

temporarily deforming the female end to receive the male end; and

inserting the male end into the female end.

35. (New) A method of joining pipe, including the steps of:

providing the apparatus of Claim 20;

temporarily expanding the female end to receive the male end;

inserting the male end into the female end; and

permitting the engagement element to act between the first and second pieces of pipe.

36. (New) Apparatus for joining a plurality of pieces of pipe, including:

a first piece of pipe and a second piece of pipe each having a similar size and shape
sidewall corrugation pattern along their lengths;

a first female engagement structure formed from the sidewall corrugation pattern of the
first piece of pipe; and

a male engagement structure formed from the sidewall corrugation pattern of the second
piece of pipe,

the first female structure being temporarily deformed for receiving the male structure, the

temporary deformation being both sufficiently large to permit the insertion of the male structure

but also sufficiently small to ensure that material memory returns the first female structure toward its original non-deformed configuration with sufficient compressive force to grip the male structure and prevent its inadvertent removal from engagement with the first female structure.

37. A coupling system for coupling pipe segments to each other, the system including:
a plurality of pipe segments each having a similar size and shape sidewall corrugation pattern along its length, the corrugation pattern including:
a female end formed from the corrugation of the first pipe segment; and
a male end formed from the corrugation of a second pipe segment,
wherein at least one of said female and said male ends being temporarily deformed within its elastic limits to permit insertion of said male end into said female end, at least one of said temporarily deformed said female and said male end returning toward its original configuration following insertion of said male end into said female end, said female and male ends configured so that hoop stresses are generated by material memory of said deformed end to maintain desired engagement between said pipe segments.

38. (New) A pipe joint comprising:

first and second pieces of pipe having a generally uniform corrugated sidewall pattern along their lengths;

a female end of said first piece of pipe formed from said corrugated sidewall pattern by temporary expansion of said female end via application of energy thereto, said expansion not exceeding the limits of the pipe material's ability to return substantially to its original shape and size; and

a non-expanded end of said second piece of pipe insertable within said female end of said first piece of pipe while said female end is expanded.